

## DNA: THE STUFF OF LIFE (NOTES ORGANIZER)

### 1. Frederick Griffith – 1928

- a. Who was Griffith and what was his scientific interest?
- b. Griffith's experiment led to the discovery that \_\_\_\_\_ could be passed between living organisms.
- c. Describe Griffith's experiment:
- d. The harmless strain of bacteria transformed into the disease-causing strain. What is transformation?

### 2. Oswald Avery – 1944

- a. Why did Oswald Avery repeat Griffith's work?
- b. Oswald concluded that the \_\_\_\_\_ molecule was the genetic material passing between bacteria.

### 3. Hershey and Chase – 1952

- a. Alfred Hershey and Martha Chase studied \_\_\_\_\_.
- b. What is a bacteriophage and what is it made up of?
- c. Hershey and Chase wanted to determine whether proteins or DNA were released by viruses. They did this by growing them in cultures containing \_\_\_\_\_.
- d. Radioactive Phosphorous attaches to which part of the bacteriophage?
- e. Radioactive Sulfur attaches to which part of the bacteriophage?
- f. Describe the overall purpose of the Hershey and Chase experiment:
- g. What was the conclusion?

#### 4. Erwin Chargaff – 1950

- a. Chargaff studied the four \_\_\_\_\_.
- b. What did Chargaff's data illustrate?
- c. What is "Chargaff's Rule?"
- d. The nitrogen bases exist in two forms.
  - i. \_\_\_\_\_ are single ring bases. Examples:
  - ii. \_\_\_\_\_ are double ring bases. Examples:

#### 5. Rosalind Franklin – 1951

- a. What scientific technique was used by Rosalind Franklin in order to take "pictures" of DNA?
- b. Describe the significance of Franklin's Photo 51.

#### 6. James Watson and Francis Crick – 1951

- a. Watson and Crick built the first accurate \_\_\_\_\_ representing the structure of DNA.
- b. Describe Watson and Crick's DNA model:

#### 7. DNA Structure

- a. DNA is often thought of as a " \_\_\_\_\_ " because of its double helix shape.
- b. What forms the "rails," or sides, of the ladder?
- c. What forms the "rungs," or steps, of the ladder?

- d. Watson and Crick discovered that hydrogen bonds can only form between certain pairs.
  - i. How many hydrogen bonds form between Adenine and Thymine?
  - ii. How many hydrogen bonds form between Cytosine and Guanine?
  - iii. In other words, a \_\_\_\_\_ is always paired with a \_\_\_\_\_.
- e. Nucleotides are the monomers of the DNA macromolecule. What three parts make up a nucleotide?

**8. DNA Replication**

- a. \_\_\_\_\_ → \_\_\_\_\_
- b. What is replication?
- c. Describe the purpose of DNA replication:
- d. When does DNA replication occur?
- e. Each strand of the original DNA serves as a \_\_\_\_\_ for the new strand.
  - i. This is known as what?
- f. Use this T-chart to describe DNA replication in prokaryotic and eukaryotic organisms.

Prokaryotic DNA Replication	Eukaryotic DNA Replication

- g. The sites where separation and replication occur are known as \_\_\_\_\_.

**9. Process of DNA Replication.**

- a. DNA must first unwind and “unzip.” What enzyme is responsible for the unwinding and unzipping of the DNA molecule?
- b. The enzyme \_\_\_\_\_ then adds a short segment of RNA, called an RNA primer, to each DNA strand.
- c. Which enzyme continues adding appropriate DNA nucleotides to the chain of the new strand?
- d. What are Okazaki fragments?
- e. Which enzyme is responsible for linking together together the many Okazaki fragments?

**10. DNA Replication Practice**

- a. Give the complementary sequence for the following strand of DNA:

DNA 5' A T C C G A A G C T T 3'

DNA

Properly label the image below identifying all components of DNA replication.

